

IN THE CLAIMS:

The following is a complete listing of claims in this application.

1. (currently amended) A method for determining the relative position between two or more objects in a marine environment, including waterways, of which at least one object can be maneuvered relative to one or more other objects, where at least one interrogator is arranged on one or more of the objects and sends a radio wave signal to at least one transponder arranged on one or more of the other objects, ~~characterized by combining the following~~ comprising the steps of:

using a FMCW radar in the interrogator,
using the transponders for bringing identity tags into the signals to be reflected to the interrogator, and
using attitude determination.

2. (currently amended) A method according to claim 1, ~~characterized by the following steps~~ wherein:

~~that~~ at least one interrogator sends a radio signal to at least one transponder arranged on an object for relative positioning,

~~that~~ one or more transponders modulates an identifier frequency into the signal from the interrogator prior to the signal being reflected to the interrogator,

~~that~~ the signals from the transponders are received by a series of antenna elements in the interrogator,

~~that~~ the combination of the signals received on different antenna elements is used to determine the angles to the transponders in two planes relative to the antenna elements geometry, and

~~that~~ the signals from the transponders are processed to determine the beat frequencies and the Doppler frequencies for

each transponder, and

~~that~~ this is used for determining the distance and the relative velocity between the interrogator and each of the transponders, which from the frequency of the carrier signal, can determine the identity of the signal and on this basis determine the position data.

3. (currently amended) Method according to claim 2, ~~characterized in that~~ wherein one or more interrogators are simultaneously interrogating multiple transponders.

4. (currently amended) Method according to claim 2 ~~or 3~~, ~~characterized in that~~ wherein an interrogator is operated autonomously towards any transponder.

5. (currently amended) Method according to claim 3 ~~or 4~~, ~~characterized in that~~ wherein the interrogator illuminates all the transponders simultaneously.

6. (currently amended) Method according to ~~anyone of claims 2-5~~, ~~characterized by~~ claim 2, comprising combining the distance and angles in two planes, for positioning of one or more transponders in 3 dimensions.

7. (currently amended) Method according to ~~anyone of claims 2-6~~, ~~characterized in~~ claim 2, comprising combining the relative distance and angles with attitude determination systems, to provide an absolute determination of transponders or interrogators.

8. (currently amended) Method according to ~~anyone of claims 2-7~~, ~~characterized in that~~ claim 2, wherein a fixed transponder at the same object as the interrogator, is used for continuous self calibration and integrity monitoring.

9. (currently amended) Method according to ~~anyone of claims 2-8~~, ~~characterized in that~~ claim 2, wherein a differential positioning between two or more transponders is carried out.

10. (currently amended) Method according to ~~anyone of claims 2-9, characterized in that~~ claim 2, wherein a position determination of the interrogator from ranges is obtained, when the relative or absolute position of the transponders is known.

11. (currently amended) System for carrying out the method of claim 1, for determining the relative position between two or more objects (10, 12) in a marine environment, including waterways, of which at least one object (10) can be maneuvered relative to one or more other objects (12), where at least one interrogator (20) is arranged on one of the objects (10) and provided to transmit a radio wave signal to at least one transponder (Tr) arranged on one or more of the other objects (12), ~~characterized by comprising following elements:~~

a FMCW radar in the at least one interrogator (12) and at least one transponder (Tr) is provided to generate a different sideband frequency to introduce an identity tag into a signal to be reflected to the interrogator, and

a signal processing unit with software containing algorithms for determination of ranges, velocities and angles to transponders.

12. (currently amended) System according to claim 11, ~~characterized in that~~ wherein the interrogator (20) is implemented with non-moving elements.

13. (currently amended) System according to claim 11 ~~or 12, characterized in that~~ wherein a fixed transponder is provided on the same object as the interrogator, for continuous self calibration and integrity monitoring.